

Piston Temperature Profile CAT-1P & C13



James McCord

November 11, 2004



Piston Temperature Profile

- Standard operating conditions (as per current procedure)
- Both test were performed on calibrated stands
- 4 hour duration
- Six C13 pistons were equipped with 29 plugs each
- One CAT-1P piston was equipped with 29 plugs
- Four plugs were installed per land/groove location (Front, Rear, Thrust, and Anti-thrust) and one plug in the under crown.
- Depending on piston location, M3-2 or M1.6-2 plugs were utilized (see photo for plug locations)
- Optimum accuracy of method: +/- 6 C

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CAT-1P & C13

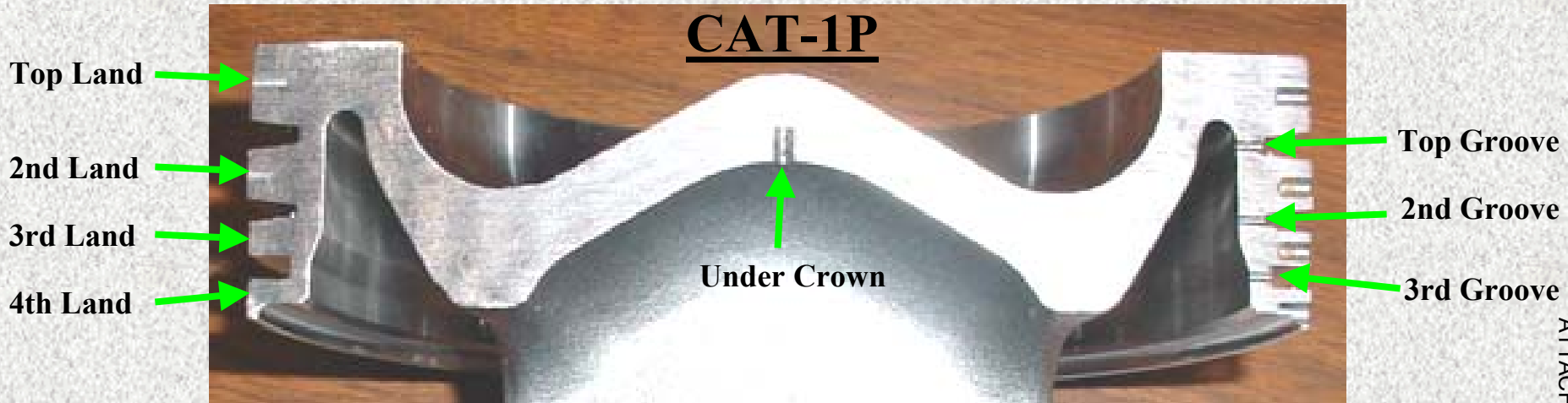
Operation Conditions

Operational Parameters	CAT C13	CAT 1P
Test Duration (hrs)	4	4
Engine Speed (rpm)	1800	1800
Fuel Flow (g/min)	1200	185
Coolant Out Temperature (C)	88	90
Intake Manifold Temperature (C)	40	60
Exhaust Manifold Temperature (C)	670	490
Oil Gallery Temperature (C)	105	130
Fuel Temperature (C)	40	42
Intake Manifold Pressure (kPa-g)	280	173

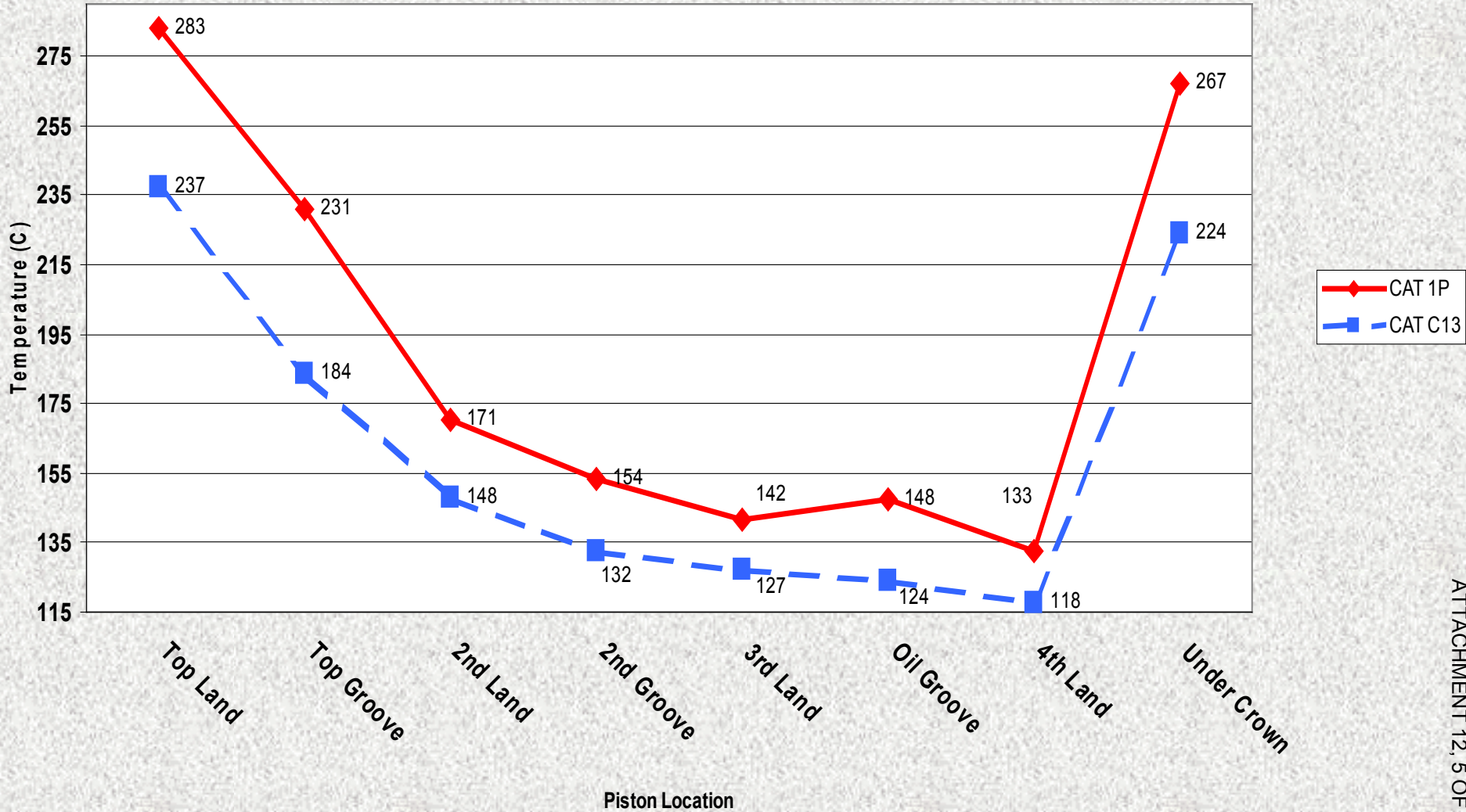
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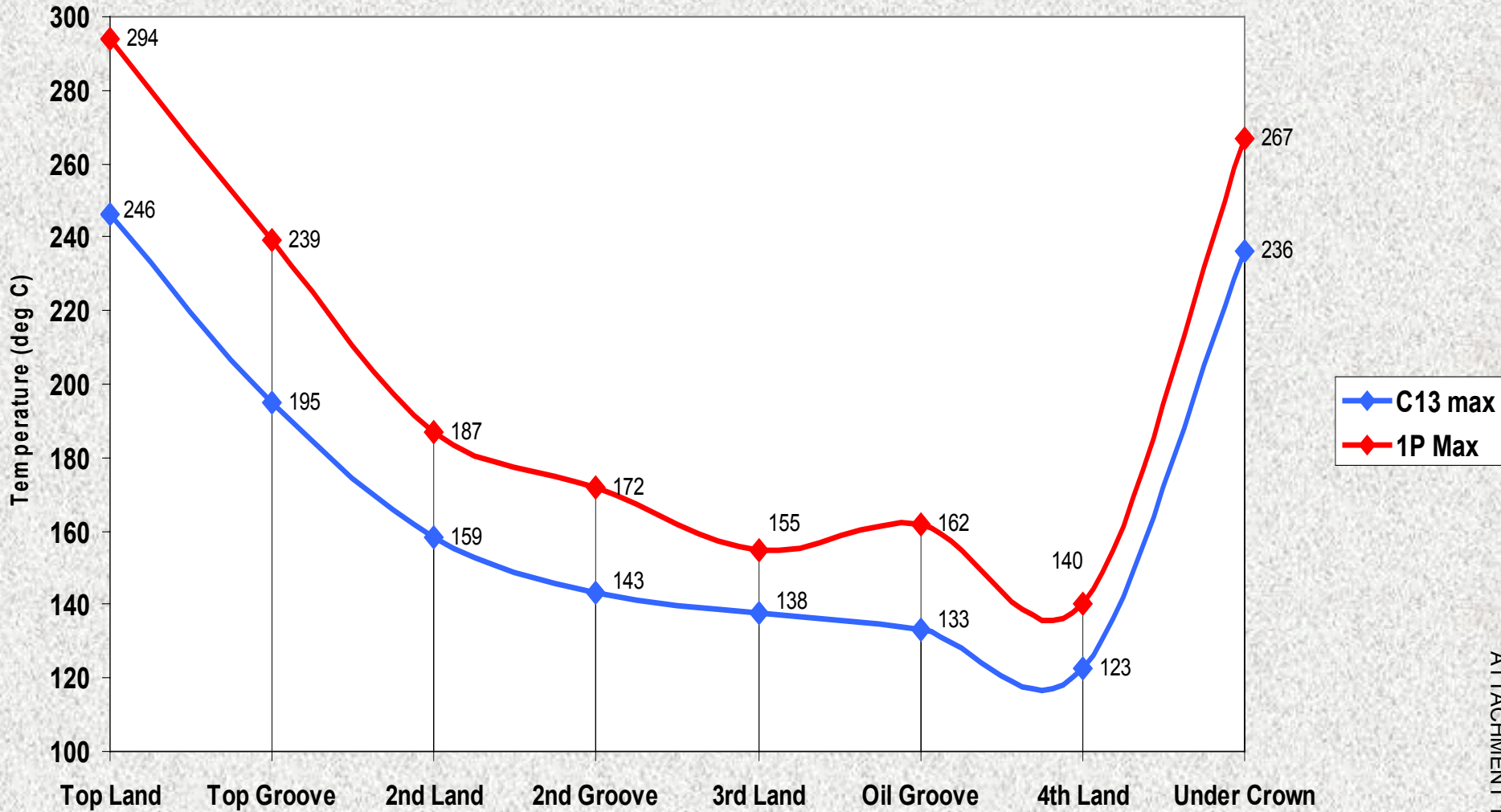
Templug Locations



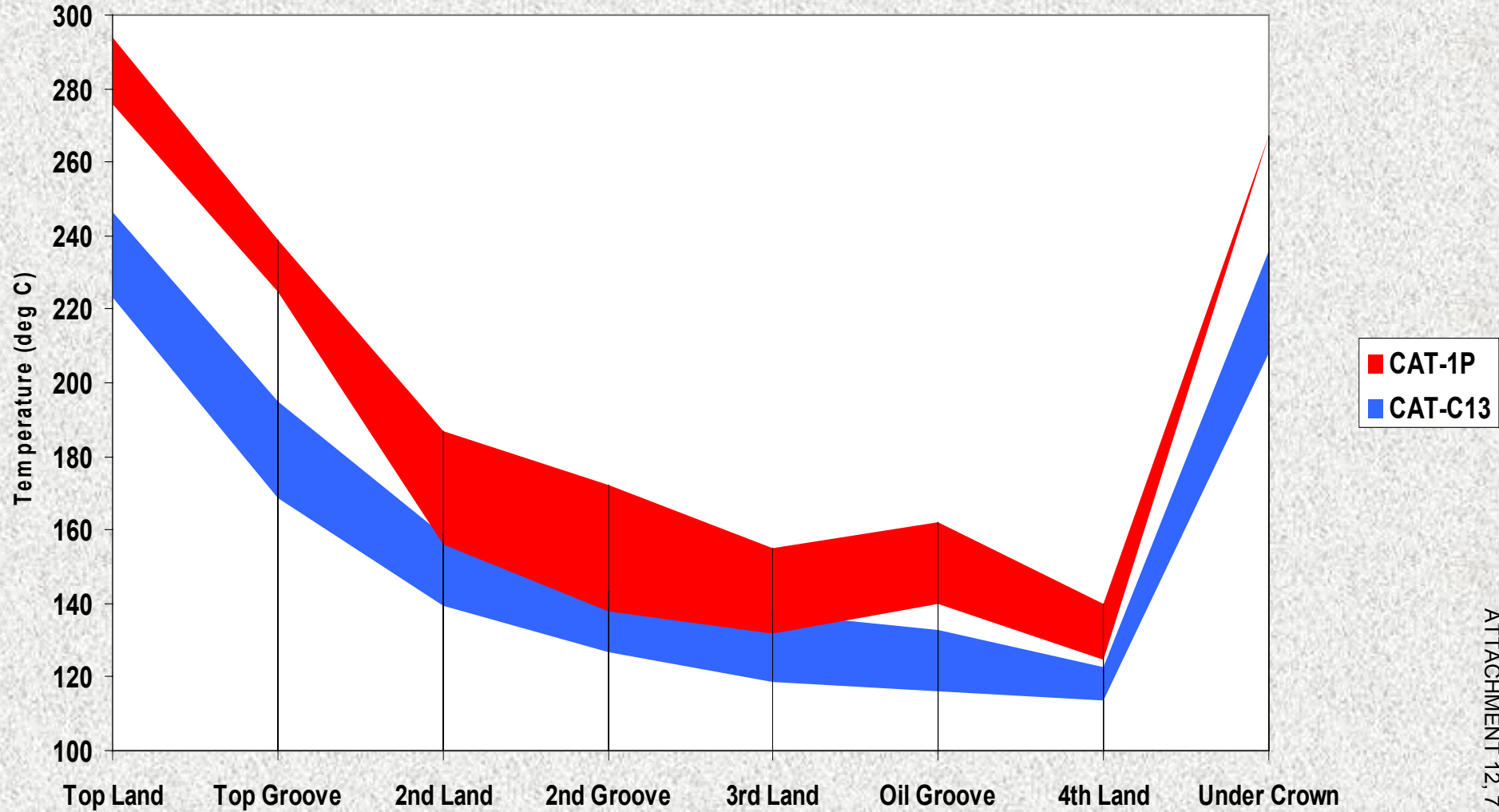
Average Temperature Profile CAT-1P & CAT-C13



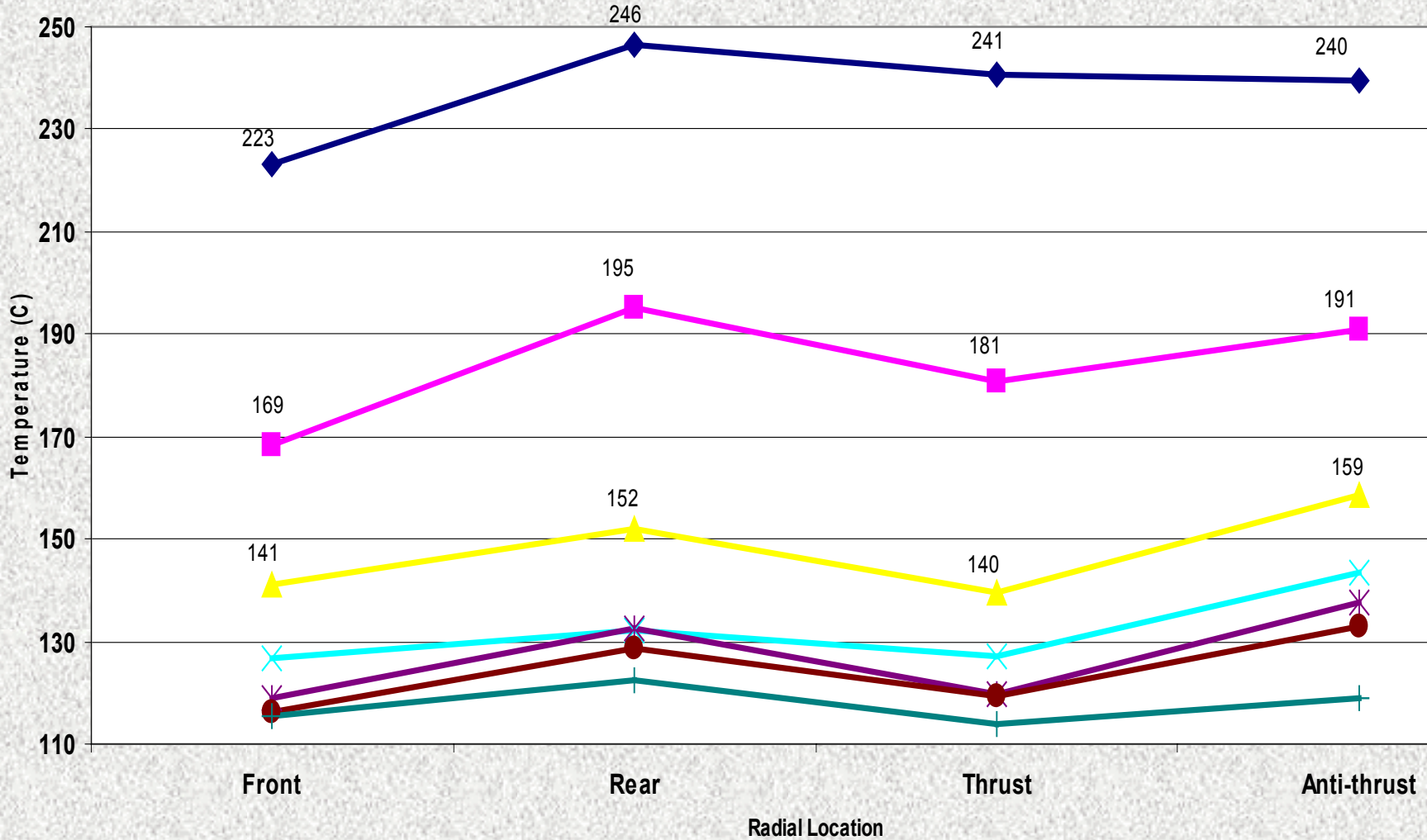
Maximum Temperature Profile CAT-1P & CAT-C13



Min/Max Temperature Profile CAT-1P & CAT-C13



CAT C13 Piston Temperature (average of six pistons)



◆ Top Land ■ Top Groove ▲ 2nd Land ✕ 2nd Groove ✖ 3rd Land ● 3rd Groove + 4th Land

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CAT-1P

Temperature Data

CAT 1P						
Piston 1		Front	Rear	Thrust	Anti-thrust	Plug Type
Top Land	Deg C	279	283	276	294	M3 #2
Top Groove	Deg C	231	225	228	239	M1.6 #2
2nd Land	Deg C	172	167	156	187	M3 #2
2nd Groove	Deg C	172	138	142	162	M1.6 #2
3rd Land	Deg C	142	132	138	155	M3 #2
3rd Groove	Deg C	140	145	143	162	M1.6 #2
4th Land	Deg C	140	125	128	138	M3 #2
Under Crown	Deg C	267				M3 #2



CAT-C13

Temperature Data

CAT C13 (6-piston avg.)

Piston Location		Front	Rear	Thrust	Anti-thrust	Average
Top Land	Temp C	223	246	241	240	237
Top Groove		169	195	181	191	184
2nd Land		141	152	140	159	148
2nd Groove		127	132	127	143	132
3rd Land		119	133	120	138	127
3rd Groove		116	129	119	133	124
4th Land		115	123	114	119	118
Under Crown		224				224

